On some mathematical connections between Ramanujan Recurring Numbers. New possible solutions connected with some parameters of String Theory

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Abstract

In this paper, we describe some mathematical connections between Ramanujan Recurring Numbers. We obtain new possible solutions connected with some parameters of String Theory

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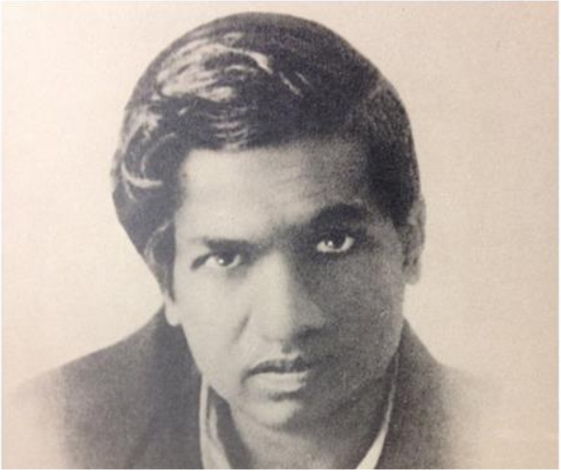
Srinivasa Ramanujan (1887-1920)



https://www.moduscc.it/ramanujan-il-grande-matematico-indiano-13453-131115/

Numeri Ricorrenti di Ramanujan

$$4096$$

$$64^2 = 8^4$$

$$1729$$

$$10^3+9^3 = 12^3+1^3 \quad \text{(Taxicab)}$$

$$64\times 27+1 = 8^2\times 3^3+1$$

$$27\times\sqrt{4096}+1 = 27\times 64+1 = \boxed{1729}$$

$$= \underline{3}^3\times\underline{8}^2+1$$

$$\left[1/27\cdot(1729-1)\right]^2 = (1/27\cdot 1728)^2 = 64^2 = 4096$$

$$= \underline{8}^4 = \boxed{4096}$$

$$\sqrt[15]{1729} = 1{,}6438152287\ldots\ ;$$

$$\sqrt[15]{1729} + (\text{MRB const})^{(1-1/(4\pi)+\pi)} = 1{,}6438152287 + (\text{MRB const})^{(1-1/(4\pi)+\pi)} = \underline{1{,}644938}\ldots \simeq \underline{1{,}644934}\ldots = \underline{\zeta(2)} =$$

$$= \frac{\pi^2}{6} = \pi\cdot\pi\cdot\frac{1}{6}$$

$$\boxed{4096+1729 = 5825}\ ;\quad \frac{1}{25}\cdot\frac{1}{144}\cdot(4096+1729) = \frac{233}{144} = \underline{1{,}61805}\ldots \simeq \phi$$

$$= \underline{1{,}61803398}\ldots$$

$$= \frac{\sqrt{5}+1}{2}$$

denominatori

$$25 = 5^2\ ;\quad 144 = 12^2 \qquad 144+25 = 169 = 13^2$$

$$\boxed{\sqrt{169}} = \sqrt{144+25} = \underline{13}$$

$$\sqrt{\frac{\pi^2}{6}\cdot\frac{\sqrt{5}+1}{2}} = \underline{1{,}63142858544 6823}\ldots$$ valore vicino alla sottostante media

$$\frac{1}{2}\left(\frac{\pi^2}{6}+\frac{\sqrt{5}+1}{2}\right) = \underline{1{,}63148402779906}\ldots$$ media fra le due costanti

Differenza tra 4096 e 1729

$$\frac{1}{\underline{86}} \cdot \frac{1}{\underline{17}} \cdot (\underline{4096} - \underline{1729}) =$$

$$= \frac{2367}{1462} = \underline{1,61901504787 9}\ldots \simeq \Phi = \underline{1.6180339}8$$

$$\frac{1}{\underline{90}} \cdot \frac{1}{\underline{16}} \cdot (\underline{4096} - \underline{1729}) =$$

$$= \frac{263}{160} = \underline{1,64375} \approx \zeta(2) = \frac{\pi^2}{6} = \underline{1,644934}\ldots$$

$$(\underline{90} - \underline{16} + \underline{86} - \underline{17}) = 143 \; ; \quad 233 \cdot \frac{1}{(90-16+86-17)+1} = \frac{233}{144} = \underline{1,6180}\bar{5} \approx \phi$$

Prodotto tra 4096 e 1729

$$(\underline{4096} \cdot \underline{1729})^{1/33} = 2^{4/11} \cdot \sqrt[33]{\underline{1729}} = \underline{1.6127997697542 7}\ldots \simeq \Phi = \underline{1.6180339}8$$

$$\frac{1}{2}\left[(\underline{4096} \cdot \underline{1729})^{1/34} + (\underline{4096} \cdot \underline{1729})^{1/30}\right] = \frac{1}{2}\left(\sqrt[34]{\underline{4096} \cdot \underline{1729}} + \sqrt[30]{\underline{4096} \cdot \underline{1729}}\right) =$$

$$= \frac{1}{2}\left(2^{6/17} \cdot \sqrt[34]{\underline{1729}} + 2^{2/5} \cdot \sqrt[30]{\underline{1729}}\right) = \underline{1,64102233940 95}\ldots \simeq \zeta(2) = \frac{\pi^2}{6} = \underline{1,644934}$$

$$\frac{1}{8} \cdot (\underline{4096} \cdot \underline{1729})^{1/3} = \frac{1}{8} \cdot \sqrt[3]{\underline{4096} \cdot \underline{1729}} = 2\sqrt[3]{\underline{1729}} = \underline{24,0046287 3685 \simeq 24}$$

modi di vibrazione delle stringhe bosoniche

Divisione tra 4096 e 1729

$$\left[2\cdot\left(\underline{4096}/\underline{1729}\right)\right]^{1/\pi} =$$

$$= \sqrt[\pi]{2\cdot\boxed{\frac{4096}{1729}}} = \sqrt[\pi]{\frac{8192}{1729}} = \underline{1{,}640773192442} \simeq \underline{\zeta(2)} = \frac{\pi^2}{6} = \underline{1{,}644934}\ldots$$

$$\underline{a)}\ \left[\left(e+1/2e\right)\cdot\left(\underline{4096}/\underline{1729}\right)\right]^{1/4} = \sqrt[4]{\left(e+\frac{1}{2e}\right)\cdot\boxed{\frac{4096}{1729}}} = 8\cdot\sqrt[4]{\frac{\frac{1}{2e}+e}{\underline{1729}}} = \underline{1{,}61928718643}\ldots$$

$$\underline{\simeq 1{,}61803398 = \phi}$$

$$\underline{b)}\ \left[\left(e+\frac{1}{6}\right)\left(\underline{4096}/\underline{1729}\right)\right]^{1/4} = \sqrt[4]{\left(e+\frac{1}{6}\right)\cdot\boxed{\frac{4096}{1729}}} = 8\cdot\sqrt[4]{\frac{\frac{1}{6}+e}{\underline{1729}}} = \underline{1{,}616872426} \simeq \phi =$$

$$= \underline{1{,}61803398}\ldots$$

Media tra a) e b):

$$\frac{1}{2}\left[\left(\sqrt[4]{\left(e+\frac{1}{2e}\right)\cdot\boxed{\frac{4096}{1729}}}\right)+\left(\sqrt[4]{\left(e+\frac{1}{6}\right)\cdot\boxed{\frac{4096}{1729}}}\right)\right] = \frac{1}{2}\cdot\left(8\sqrt[4]{\frac{\frac{1}{6}+e}{\underline{1729}}} + 8\cdot\sqrt[4]{\frac{\frac{1}{2e}+e}{\underline{1729}}}\right) =$$

$$= \underline{1{,}618079806259}\ldots \underline{\simeq \phi = 1{,}61803398}$$

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Connessioni matematiche con i Numeri Ricorrenti di Ramanujan

4096, 1729, φ e $\zeta(2)$

$$\sqrt{\left(\zeta(2)\times\frac{\varphi}{\sqrt{1729}}\right)\left(1729\times\frac{1}{\varphi}\times\frac{1}{\zeta(2)}\right)} =$$

$$= \sqrt{\left(\frac{\pi^2}{6}\times\frac{\varphi}{\sqrt{1729}}\right)\left(1729\times\frac{1}{\varphi}\cdot\frac{1}{\zeta(2)}\right)} = \boxed{\sqrt[4]{1729}} = 6,4483521749811\ldots$$

$$\sqrt{\left(\zeta(2)\times\frac{\varphi}{\sqrt{1729}}\right)\left(4096\times\frac{1}{\varphi}\times\frac{1}{\zeta(2)}\right)} =$$

$$= \sqrt{\left(\frac{\pi^2}{6}\times\frac{\varphi}{\sqrt{1729}}\right)\left(4096\times\frac{1}{\varphi}\times\frac{1}{\zeta(2)}\right)} = \boxed{\frac{64}{\sqrt[4]{1729}}} \simeq 9,9250162310168\ldots$$

$$\boxed{\sqrt{\sqrt[4]{1729}\times\frac{64}{\sqrt[4]{1729}}} = \mathbf{8} \quad ; \quad 3\cdot\sqrt{\sqrt[4]{1729}\times\frac{64}{\sqrt[4]{1729}}} = 3\cdot 8 = \mathbf{24}}$$

$$\sqrt{\left(\frac{\pi^2}{6}\times\frac{\varphi}{\sqrt{1729}}\right)}\sqrt{\left(4096\times\frac{1}{\varphi}\times\frac{1}{\zeta(2)}\right)\left(1729\times\frac{1}{\varphi}\times\frac{1}{\zeta(2)}\right)} = \qquad \zeta(2) = \frac{\pi^2}{6}$$

$$= \mathbf{8}\,,$$

$$3\cdot\sqrt{\left(\frac{\pi^2}{6}\times\frac{\varphi}{\sqrt{1729}}\right)}\sqrt{\left(4096\times\frac{1}{\varphi}\times\frac{1}{\zeta(2)}\right)\left(1729\times\frac{1}{\varphi}\times\frac{1}{\zeta(2)}\right)} = 3\cdot 8 = \mathbf{24}$$

Dove 8 e 24 rappresentano il numero delle vibrazioni fisiche delle superstringhe e delle stringhe bosoniche, rispettivamente

Della seguente formula:

$$\sqrt{\left(\frac{\pi^2}{6}\times\frac{\varphi}{\sqrt{1729}}\right)\left(4096\times\frac{1}{\varphi}\times\frac{1}{\zeta(2)}\right)}$$ mi ricavo π. Posto $\pi = x$

$$\sqrt{\left(\frac{x^2}{6}\times\frac{\varphi}{\sqrt{1729}}\right)\left(4096\times\frac{1}{\varphi}\times\frac{1}{\zeta(2)}\right)} = \frac{64}{\sqrt[4]{1729}}$$. otteniamo:

$$\frac{64\sqrt{x^2}}{\sqrt[4]{1729}\cdot\pi} = \frac{64}{\sqrt[4]{1729}}$$

Una forma alternativa assumendo $x>0$, è la seguente:

$$\boxed{\frac{64x}{\sqrt[4]{1729}\,\pi} = \frac{64}{\sqrt[4]{1729}}}$$

Le soluzioni sono: $\begin{cases} x = -\pi \\ x = \pi \end{cases}$

La seguente formula è la "forma logaritmica:

$$\log_{\sqrt[4]{1729}}\left(\sqrt{\frac{(x^2\cdot\varphi)\cdot 4096}{(6\sqrt{1729})(\varphi\cdot\zeta(2))}}\right) = \log_{\sqrt[4]{1729}}(64) - \log_{\sqrt[4]{1729}}\left(\sqrt[4]{1729}\right)$$

Il risultato è il seguente:

$$\boxed{\frac{4\log\left(\frac{64\sqrt{x^2}}{\sqrt[4]{1729}\,\pi}\right)}{\log(1729)} = \frac{4\log(64)}{\log(1729)} - 1}$$ e le soluzioni sono: $\begin{cases} x = -\pi \\ x = \pi \end{cases}$

Somma, differenza e rapporto tra Numeri Ricorrenti di Ramanujan

$$\frac{1}{2}\cdot\left[\frac{3}{4}\cdot\sqrt[5]{\left(\underline{4096}+\underline{1729}+\underline{\varphi}+\frac{\pi^2}{\underline{6}}\right)^2}+\frac{1}{2}\left(\sqrt{\underline{4096}-\underline{1729}-\underline{\varphi}-\frac{\pi^2}{\underline{6}}-\frac{\pi^2}{3}}\right)\right]+\zeta(2)-1$$

$$=\frac{1}{2}\left[\frac{3}{4}\cdot\left(\varphi+5825+\frac{\pi^2}{6}\right)^{2/5}+\frac{1}{2}\left(\sqrt{-\varphi+2367-\frac{\pi^2}{6}-\frac{\pi^2}{3}}\right)\right]-1+\frac{\pi^2}{6}=$$

$$=24,0065186340186\ldots\simeq 24$$

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$$3\left[\frac{1}{2}\left(-\log\left(\frac{1}{\underline{4096}}\times\frac{1}{\underline{1729}}\times\frac{1}{\underline{\varphi}}\times\frac{1}{\frac{\pi^2}{\underline{6}}}\right)\right)-\frac{3}{8}\right]=$$

$$=3\left[-\frac{1}{2}\log\left(\frac{3}{3540992\,\pi^2\varphi}\right)-\frac{3}{8}\right]=$$

$$=24,0029651698847\ldots\simeq 24$$ numero delle vibrazioni fisiche delle stringhe bosoniche

$$\left(\sqrt{\underline{4096}}\cdot\sqrt{\underline{1729}}\cdot\sqrt{\underline{\varphi}}\cdot\sqrt{\underline{\frac{\pi^2}{6}}}\right)-\gamma+29+2=$$

$$=32\pi\cdot\sqrt{\frac{3458\varphi}{3}}+31-\gamma=4371.980094535\simeq\underline{4372}=\underline{4096}+276$$

$$\sqrt[4]{\sqrt{\underline{4096}}\,\sqrt{\underline{1729}}\,\sqrt{\underline{\varphi}}\cdot\sqrt{\underline{\frac{\pi^2}{6}}}}-\frac{2}{\varphi}\log^2(2)\log(3)=\quad;\quad\frac{2}{\varphi}\log^2(2)\log(3)=0.1172959$$

$$=2\times2^{3/8}\sqrt[4]{\pi}\cdot\sqrt[8]{\frac{\underline{1729}\varphi}{3}}-\frac{2}{\varphi}\log^2(2)\log(3)=$$

Radici e numeri
ricorrenti di Ramanujan

$$=8,000000122288197\ldots\simeq8$$

$$3\times\left(2\times2^{3/8}\sqrt[4]{\pi}\cdot\sqrt[8]{\frac{\underline{1729}\varphi}{3}}-\frac{2}{\varphi}\log^2(2)\log(3)\right)\simeq$$

$$3\cdot\sqrt[4]{\sqrt{\underline{4096}}\,\sqrt{\underline{1729}}\,\sqrt{\underline{\varphi}}\,\sqrt{\underline{\frac{\pi^2}{6}}}}-\frac{2}{\varphi}\log^2(2)\log(3)-2\Phi\ \mathrm{MRB\ const}=$$

$$=-2\cdot\Phi\ \mathrm{MRB\ const}+2\times2^{3/8}\times3^{7/8}\sqrt[4]{\pi}\,\sqrt[8]{\underline{1729}\varphi}-\frac{2}{\varphi}\log^2(2)\log(3)=$$

$$=24.002384894027\ldots\simeq24$$

$$\sqrt{\underline{4096}} + \sqrt{\underline{1729}} - \underline{\varphi} + \frac{\pi^2}{\underline{6}} = -\varphi + 64 + \sqrt{\underline{1729}} + \frac{\pi^2}{6} =$$

$$= 105{,}60814585068\ldots$$

$$\frac{1}{3}\left[\frac{1}{5}\left(\left(\sqrt{\underline{4096}} + \sqrt{\underline{1729}} - \underline{\varphi} + \frac{\pi^2}{\underline{6}}\right) - \Phi\right)\right] + 1 = \frac{1}{15}\left(-\Phi - \varphi + 64 + \sqrt{\underline{1729}} + \frac{\pi^2}{6}\right) + 1 =$$

$$\frac{1}{15}\left(-2\varphi + 65 + \sqrt{\underline{1729}} + \frac{\pi^2}{\underline{6}}\right) + 1 = \underline{7{,}99934027907954679\ldots \boxed{\simeq 8}}$$

$$3\left[\frac{1}{3}\left(\frac{1}{5}\left(\left(\sqrt{\underline{4096}} + \sqrt{\underline{1729}} - \underline{\varphi} + \frac{\pi^2}{\underline{6}}\right) - \Phi\right)\right) + 1\right] = 3 \cdot \left[\frac{1}{15}\left(-\Phi - \varphi + 64 + \sqrt{\underline{1729}} + \frac{\pi^2}{6}\right) + 1\right] =$$

$$= \frac{1}{30}\left[6\left(79 - \sqrt{5} + \sqrt{\underline{1729}}\right) + \pi^2\right] = \underline{23{,}9980223723864\ldots \boxed{\simeq 24}}$$

We have the following two numbers:

4096

$64^2 = 8^4$

$27 * \sqrt{4096} + 1 = 27 * 64 + 1 = 1729$

$= 3^3 * 8^2 + 1 = 1729$

1729

$10^3 + 9^3 = 12^3 + 1^3$

(Hardy-Ramanujan Number)

$64 * 27 + 1 = 8^2 * 3^3 + 1$

$[1/27 * (1729-1)]^2 = (1/27 * 1728)^2 =$

$= 64^2 = 4096$

$= \ 8^4 = 4096$

$\sqrt[15]{1729} \ =$

1.6438152287487281305800880313247695143292831436999401726452126788
…

$\sqrt[15]{1729} + C_{\text{MRB}}{}^{1-1/(4\pi)+\pi} \ =$

C_{MRB} is the MRB constant

1.6449380241302602579417331919463669574202424417258163802713056782
…

$1.6449380241\ldots \approx 1.644934\ldots = \zeta(2) = \pi^2/6 = \pi*\pi*1/6$

From the sum between 4096 and 1729, we obtain, after some calculations:

$4096 + 1729 = 5825$; $1/25*1/144*(4096+1729) = 233/144 = 1.61805 \approx \varphi =$

$= 1.61803398 = (\sqrt{5} + 1)/2$

From the denominators $25 = 5^2$ and $144 = 12^2$, we note that:

144 + 25 = 169 = 13^2 and that : √(144+25) = √169 = 13 (Fibonacci's number)

Now, we have also:

$$\sqrt{\frac{\pi^2}{6}\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)}$$

$$\frac{1}{2}\sqrt{\frac{1}{3}\left(1+\sqrt{5}\right)}\ \pi$$

1.6314285854468230427930574076075304695761778235949688122123688554

...

1.631428585446823… value very closed to the below mean

And also:

$$\frac{1}{2}\left(\frac{\pi^2}{6}+\frac{1}{2}\left(\sqrt{5}+1\right)\right)$$

1.6314840277990606423385010005058316534696295405062806499355034260

...

1.631484027799… mean between the two values, i.e. ζ(2) and φ

Now, we have the following expression concerning the differences between 4096 and 1729:

$$\frac{1}{86}\times\frac{1}{17}(4096-1729)$$

$$\frac{2367}{1462}$$

1.6190150478796169630642954856361149110807113543091655266757865937

...

1.6190150478796… ≈ φ = 1.61803398

$$\frac{1}{90} \times \frac{1}{16} (4096 - 1729)$$

$$\frac{263}{160}$$

1.64375

1.64375 ≈ $\zeta(2) = \pi^2/6 = 1.644934$

From the denominators of the above fractions, we obtain, from the following algebraic sum:

(90-16+86-17) = 143 ;

from which:

233/((90-16+86-17)+1)

$$\frac{233}{(90 - 16 + 86 - 17) + 1}$$

$$\frac{233}{144}$$

1.6180555555555555555555555555555555555555555555555555555555555555

…

$1.6180\overline{5}$ (period 1)

1.61805… result that is a very good approximation to the value of the golden ratio 1.618033988749

Product between 4096 and 1729

We have that:

$(4096*1729)^{1/33}$

$$\sqrt[33]{4096 \times 1729}$$

$$2^{4/11} \sqrt[33]{1729}$$

1.6127997697542704138176596520919941482463161078923716408540797775

…

1.61279976975427… result that is a very good approximation to the value of the golden ratio 1.618033988749

And also:

$$\frac{1}{2} \left(\sqrt[34]{4096 \times 1729} + \sqrt[30]{4096 \times 1729} \right)$$

$$\frac{1}{2} \left(2^{6/17} \sqrt[34]{1729} + 2^{2/5} \sqrt[30]{1729} \right)$$

1.6410223394095563436010741042441307722530748009717731910932333604

…

1.6410223394095563436… ≈ $\zeta(2) = \pi^2/6 = 1.644934$

Furthermore:

1/8*(4096*1729)^1/3

$$\frac{1}{8} \sqrt[3]{4096 \times 1729}$$

$$2 \sqrt[3]{1729}$$

24.004628736855368793171192845420492506824351595664578846370559558

…

24.00462873685536… ≈ 24 value that is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Divisions between 4096 and 1729

We have that:

$$\sqrt[\pi]{2\times\frac{4096}{1729}}$$

$$\sqrt[\pi]{\frac{8192}{1729}}$$

1.6407731924420251100310546300235313513417346140906825303106475165

…

1.640773192442… ≈ $\zeta(2) = \pi^2/6 = 1.644934$

And:

$$\sqrt[4]{\left(e+\frac{1}{2\,e}\right)\times\frac{4096}{1729}}$$

$$8\sqrt[4]{\frac{\frac{1}{2\,e}+e}{1729}}$$

1.6192871864352581867457397562431301474978411423097563402417931991

…

1.6192871864352581…

$$\sqrt[4]{\left(e+\frac{1}{6}\right)\times\frac{4096}{1729}}$$

$$8\sqrt[4]{\frac{\frac{1}{6}+e}{1729}}$$

1.616872426083131556849064653580521870558810454706841540462052429 3 …

1.6168724260831315…

We note also that:

(((e+1/6)*4096/1729)^1/4)*1/10^35

Input

$$\sqrt[4]{\left(e+\frac{1}{6}\right)\times\frac{4096}{1729}}\times\frac{1}{10^{35}}$$

Exact result

$$\frac{\sqrt[4]{\frac{\frac{1}{6}+e}{1729}}}{12\,500\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

Decimal approximation

$1.616872426083131556849064653580521870558810454706841540462\ldots\times 10^{-35}$

$1.61687242608313\ldots*10^{-35}$ result very closed to the Planck Length $1.616255*10^{-35}$

Property

$$\frac{\sqrt[4]{\frac{\frac{1}{6}+e}{1729}}}{12\,500\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$ is a transcendental number

Expanded form

$$\frac{\sqrt[4]{\frac{1}{10\,374}+\frac{e}{1729}}}{12\,500\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

Alternate form

$$\frac{\sqrt[4]{\frac{1+6\,e}{10\,374}}}{12\,500\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

Alternative representation

$$\frac{\sqrt[4]{\frac{\left(e+\frac{1}{6}\right)4096}{1729}}}{10^{35}}=\frac{\sqrt[4]{\frac{\left(\exp(z)+\frac{1}{6}\right)4096}{1729}}}{10^{35}} \quad \text{for } z=1$$

Series representations

$$\frac{\sqrt[4]{\frac{\left(e+\frac{1}{6}\right)4096}{1729}}}{10^{35}}=\frac{\sqrt[4]{\frac{1}{6}+\sum_{k=0}^{\infty}\frac{1}{k!}}}{12\,500\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,\sqrt[4]{1729}}$$

$$\frac{\sqrt[4]{\frac{\left(e+\frac{1}{6}\right)4096}{1729}}}{10^{35}}=\frac{\sqrt[4]{1+3\sum_{k=0}^{\infty}\frac{1+k}{k!}}}{12\,500\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,\sqrt[4]{10\,374}}$$

$$\frac{\sqrt[4]{\frac{\left(e+\frac{1}{6}\right)4096}{1729}}}{10^{35}}=\frac{\sqrt[4]{\frac{1}{6}+\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}}}{12\,500\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,\sqrt[4]{1729}}$$

$n!$ is the factorial function

From the mean between the two above expressions, we obtain:

$$\frac{1}{2}\left(\sqrt[4]{\left(e+\frac{1}{2\,e}\right)\times\frac{4096}{1729}}+\sqrt[4]{\left(e+\frac{1}{6}\right)\times\frac{4096}{1729}}\right)$$

$$\frac{1}{2}\left(8\sqrt[4]{\frac{\frac{1}{6}+e}{1729}}+8\sqrt[4]{\frac{\frac{1}{2\,e}+e}{1729}}\right)$$

1.6180798062591948717974022049118260090283257985082989403519228142
…

1.61807980625919487… result that is a very good approximation to the value of the golden ratio 1.618033988749…

From the following formula

$$\sqrt{\left(\frac{\pi^2}{6}\times\frac{\phi}{\sqrt{1729}}\right)\left(4096\times\frac{1}{\phi}\times\frac{1}{\zeta(2)}\right)}$$

for $\pi = x$

$$\sqrt{\left(\frac{x^2}{6}\times\frac{\phi}{\sqrt{1729}}\right)\left(4096\times\frac{1}{\phi}\times\frac{1}{\zeta(2)}\right)}=\frac{64}{\sqrt[4]{1729}}$$

$\zeta(s)$ is the Riemann zeta function
ϕ is the golden ratio

$$\frac{64\sqrt{x^2}}{\sqrt[4]{1729}\,\pi}=\frac{64}{\sqrt[4]{1729}}$$

Alternate form assuming x>0

$$\frac{64\,x}{\sqrt[4]{1729}\,\pi}=\frac{64}{\sqrt[4]{1729}}$$

Solutions

$x = -\pi$

$x = \pi$

Logarithmic form

$$\log_{\sqrt[4]{1729}}\left(\sqrt{\frac{(x^2\,\phi)\,4096}{\left(6\sqrt{1729}\right)(\phi\,\zeta(2))}}\right) = \log_{\sqrt[4]{1729}}(64) - \log_{\sqrt[4]{1729}}\left(\sqrt[4]{1729}\right)$$

$$\frac{4\log\left(\frac{64\sqrt{x^2}}{\sqrt[4]{1729}\;\pi}\right)}{\log(1729)} = \frac{4\log(64)}{\log(1729)} - 1$$

Solutions

$x = -\pi$

$x = \pi$

Mathematical Connections with Ramanujan's Recurring Numbers 4096, 1729, φ and ζ(2)

This is a fundamental expression, where all the Ramanujan Recurring Numbers are present:

sqrt[(Pi^2/6)*(φ/sqrt(1729))*sqrt((((4096*1/φ*1/(zeta(2)))*((1729*1/φ*1/(zeta(2)))))
))]

$$\sqrt{\frac{\pi^2}{6}\times\frac{\phi}{\sqrt{1729}}\sqrt{\left(4096\times\frac{1}{\phi}\times\frac{1}{\zeta(2)}\right)\left(1729\times\frac{1}{\phi}\times\frac{1}{\zeta(2)}\right)}}$$

$= 8$

= 8 value that is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 8 "modes" corresponding to the physical vibrations of a superstring.

Alternative representations

$$\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}} = \sqrt{\frac{\phi\,\pi^2\sqrt{7081984\left(\frac{1}{\phi}\right)^2\left(\frac{1}{\zeta(2,1)}\right)^2}}{6\sqrt{1729}}}$$

$$\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}} = \sqrt{\frac{\phi\,\pi^2\sqrt{7081984\left(\frac{1}{\phi}\right)^2\left(\frac{1}{S_{1,1}(1)}\right)^2}}{6\sqrt{1729}}}$$

$$\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}} = \sqrt{\frac{\phi\,\pi^2\sqrt{7081984\left(\frac{1}{\phi}\right)^2\left(-\frac{1}{\frac{\mathrm{Li}_2(-1)}{\frac{1}{2}}}\right)^2}}{6\sqrt{1729}}}$$

Series representations

$$\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}} = \sqrt{\frac{\phi\,\pi^2\sqrt{\frac{7081984}{\phi^2\left(\sum_{k=1}^{\infty}\frac{1}{k^2}\right)^2}}}{6\sqrt{1729}}}$$

$$\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}} = \sqrt{\frac{\phi\,\pi^2\sqrt{\frac{7\,081\,984}{\phi^2\exp^2\left(-\sum_{k=1}^{\infty}\log\left(1-\frac{1}{(p_k)^2}\right)\right)}}}{6\sqrt{1729}}}$$

$$\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}} = \sqrt{\frac{\phi\,\pi^2\sqrt{\frac{7\,081\,984}{\phi^2\exp^2\left(\sum_{k=1}^{\infty}\frac{P(2\,k)}{k}\right)}}}{6\sqrt{1729}}}$$

Integral representations

$$\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}} = \sqrt{\frac{\phi\,\pi^2\sqrt{\frac{15\,934\,464\,\Gamma(2)^2}{\phi^2\left(\int_0^{\infty}t\,\operatorname{csch}(t)\,dt\right)^2}}}{6\sqrt{1729}}}$$

$$\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}} = \sqrt{\frac{\phi\,\pi^2\sqrt{\frac{7\,081\,984\,\Gamma(2)^2}{\phi^2\left(\int_0^{\infty}\frac{t}{-1+e^t}\,dt\right)^2}}}{6\sqrt{1729}}}$$

$$\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}} = \sqrt{\frac{\phi\,\pi^2\sqrt{\frac{1\,770\,496\,\Gamma(3)^2}{\phi^2\left(\int_0^{\infty}t^2\operatorname{csch}^2(t)\,dt\right)^2}}}{6\sqrt{1729}}}$$

We observe also that:

$$3\sqrt{\frac{\pi^2}{6}\times\frac{\phi}{\sqrt{1729}}\sqrt{\left(4096\times\frac{1}{\phi}\times\frac{1}{\zeta(2)}\right)\left(1729\times\frac{1}{\phi}\times\frac{1}{\zeta(2)}\right)}}$$

$= 24$

= 24 value that is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Alternative representations

$$3\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}} = 3\sqrt{\frac{\phi\,\pi^2\sqrt{7081984\left(\frac{1}{\phi}\right)^2\left(\frac{1}{\zeta(2,1)}\right)^2}}{6\sqrt{1729}}}$$

$$3\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}} = 3\sqrt{\frac{\phi\,\pi^2\sqrt{7081984\left(\frac{1}{\phi}\right)^2\left(\frac{1}{S_{1,1}(1)}\right)^2}}{6\sqrt{1729}}}$$

$$3\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}} = 3\sqrt{\frac{\phi\,\pi^2\sqrt{7081984\left(\frac{1}{\phi}\right)^2\left(-\frac{1}{\frac{\mathrm{Li}_2(-1)}{\frac{1}{2}}}\right)^2}}{6\sqrt{1729}}}$$

Series representations

$$3\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}}=3\sqrt{\frac{\phi\,\pi^2\sqrt{\frac{7\,081\,984}{\phi^2\left(\sum_{k=1}^{\infty}\frac{1}{k^2}\right)^2}}}{6\sqrt{1729}}}$$

$$3\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}}=3\sqrt{\frac{\phi\,\pi^2\sqrt{\frac{7\,081\,984}{\phi^2\exp^2\left(-\sum_{k=1}^{\infty}\log\left(1-\frac{1}{(p_k)^2}\right)\right)}}}{6\sqrt{1729}}}$$

$$3\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}}=3\sqrt{\frac{\phi\,\pi^2\sqrt{\frac{7\,081\,984}{\phi^2\exp^2\left(\sum_{k=1}^{\infty}\frac{P(2\,k)}{k}\right)}}}{6\sqrt{1729}}}$$

Integral representations

$$3\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}}=3\sqrt{\frac{\phi\,\pi^2\sqrt{\frac{15\,934\,464\,\Gamma(2)^2}{\phi^2\left(\int_0^{\infty}t\,\mathrm{csch}(t)\,dt\right)^2}}}{6\sqrt{1729}}}$$

$$3\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}}=3\sqrt{\frac{\phi\,\pi^2\sqrt{\frac{7\,081\,984\,\Gamma(2)^2}{\phi^2\left(\int_0^{\infty}\frac{t}{-1+e^t}\,dt\right)^2}}}{6\sqrt{1729}}}$$

$$3\sqrt{\frac{\left(\phi\sqrt{\frac{4096\times1729}{(\phi\,\zeta(2))\,(\phi\,\zeta(2))}}\right)\pi^2}{\sqrt{1729}\;6}} = 3\sqrt{\frac{\phi\,\pi^2\sqrt{\frac{1\,770\,496\,\Gamma(3)^2}{\phi^2\left(\int_0^\infty t^2\operatorname{csch}^2(t)\,dt\right)^2}}}{6\sqrt{1729}}}$$

Thus:

$$\sqrt{\frac{\pi^2}{6}\times\frac{\phi}{\sqrt{1729}}\sqrt{\left(4096\times\frac{1}{\phi}\times\frac{1}{\zeta(2)}\right)\left(1729\times\frac{1}{\phi}\times\frac{1}{\zeta(2)}\right)}}$$

$$= \sqrt{0.064008645723835186\sqrt{(4096\times0.375719611628)\,(1729\times0.375719611628)}}$$

$$= \sqrt{0.064008645723835186\times999.864928812}$$

$$= \sqrt{64.000000000014996461510779032}$$

$$= 8.00000000000\ldots$$

$$= 8$$

And again, from the development of the previous formula:

$$3\sqrt{0.064008645723835186\sqrt{(4096\times0.375719611628)\,(1729\times0.375719611628)}}$$

$$= 24.0000000000\ldots$$

$$= 24$$

We highlight that 8 and 24 represent the physical vibration modes of superstrings and bosonic strings, respectively.

As Prof. Michio Kaku states in his book “Hyperspace”:

In the work of Ramanujan, the number 24 appears repeatedly. This is an example of what mathematicians call magic numbers, which continually appear, where we least expect them, for reasons that no one understands. Miraculously, Ramanujan's function also appears in string theory. The number 24 appearing in Ramanujan's function is also the origin of the miraculous cancellations occurring in string theory. In string theory, each of the 24 modes in the Ramanujan function corresponds to a physical vibration of the string. Whenever the string executes its complex motions in space-time by splitting and recombining, a large number of highly sophisticated mathematical identities must be satisfied. These are precisely the mathematical identities discovered by Ramanujan. (Since physicists add two more dimensions when they count the total number of vibrations appearing in a relativistic theory, this means that space-time must have 24 + 2 = 26 space-time dimensions.'^) When the Ramanujan function is generalized, the number 24 is replaced by the number 8. Thus the critical number for the superstring is 8 + 2, or 10. This is the origin of the tenth dimension. The string vibrates in ten dimensions because it requires these generalized Ramanujan functions in order to remain self-consistent. In other words, physicists have not the slightest understanding of why ten and 26 dimensions are singled out as the dimension of the string. It's as though there is some kind of deep numerology being manifested in these functions that no one understands. It is precisely these magic numbers appearing in the elliptic modular function that determines the dimension of space-time to be ten.

Now, we analyze the following expression:

(sqrt(4096)*sqrt(1729)*sqrt(golden ratio)*sqrt(Pi^2/6))-γ+29+2

Input

$$\sqrt{4096}\ \sqrt{1729}\ \sqrt{\phi}\ \sqrt{\frac{\pi^2}{6}} - \gamma + 29 + 2$$

ϕ is the golden ratio

γ is the Euler-Mascheroni constant

Exact result

$$32\,\pi\sqrt{\frac{3458\,\phi}{3}} + 31 - \gamma$$

Decimal approximation

4371.9800945355927747696794502731717394814446463359390032772510841…

4371.9800945355…. ≈ 4372 = 4096 + 276

Expanded forms

$$31 - \gamma + 32\sqrt{\frac{1729}{3}\left(1+\sqrt{5}\right)}\ \pi$$

$$31 - \gamma + 32\sqrt{\frac{1729}{3} + \frac{1729\sqrt{5}}{3}}\ \pi$$

Alternate form

$$\frac{1}{3}\left(93 - 3\,\gamma + 32\sqrt{5187\left(1+\sqrt{5}\right)}\ \pi\right)$$

And:

((sqrt(4096)*sqrt(1729)*sqrt(golden ratio)*sqrt(Pi^2/6)))^(1/4)-2/9ln^2(2)ln(3)

where

$$\frac{2}{9}\log^2(2)\log(3)$$

is equal to 0.117295907826259

Input

$$\sqrt[4]{\sqrt{4096}\sqrt{1729}\sqrt{\phi}\sqrt{\frac{\pi^2}{6}}}-\frac{2}{9}\log^2(2)\log(3)$$

$\log(x)$ is the natural logarithm

ϕ is the golden ratio

Exact result

$$2\times 2^{3/8}\sqrt[4]{\pi}\sqrt[8]{\frac{1729\,\phi}{3}}-\frac{2}{9}\log^2(2)\log(3)$$

Decimal approximation

8.0000001222288197033787414403882005321096133328416527321450019751

...

8.0000001222288197…. ≈ 8

value that is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 8 "modes" corresponding to the physical vibrations of a superstring.

Expanded forms

$$2\times 2^{3/8}\sqrt[8]{\frac{1729}{6}+\frac{1729\sqrt{5}}{6}}\sqrt[4]{\pi}-\frac{2}{9}\log^2(2)\log(3)$$

$$2\sqrt[8]{\frac{1729}{3}\left(1+\sqrt{5}\right)}\sqrt[4]{2\pi}-\frac{2}{9}\log^2(2)\log(3)$$

Alternate forms

$$\frac{2}{9}\left(3\times2^{3/8}\times3^{7/8}\sqrt[4]{\pi}\sqrt[8]{1729\phi}-\log^2(2)\log(3)\right)$$

$$\frac{2}{9}\left(3\times3^{7/8}\sqrt[8]{1729\left(1+\sqrt{5}\right)}\sqrt[4]{2\pi}-\log^2(2)\log(3)\right)$$

Alternative representations

$$\sqrt[4]{\sqrt{4096}\sqrt{1729}\sqrt{\phi}\sqrt{\frac{\pi^2}{6}}}-\frac{2}{9}\log^2(2)\log(3)=$$
$$-\frac{2}{9}\log_e(3)\log_e^2(2)+\sqrt[4]{\sqrt{1729}\sqrt{4096}\sqrt{\phi}\sqrt{\frac{\pi^2}{6}}}$$

$$\sqrt[4]{\sqrt{4096}\sqrt{1729}\sqrt{\phi}\sqrt{\frac{\pi^2}{6}}}-\frac{2}{9}\log^2(2)\log(3)=$$
$$-\frac{2}{9}\log(a)\log_a(3)\left(\log(a)\log_a(2)\right)^2+\sqrt[4]{\sqrt{1729}\sqrt{4096}\sqrt{\phi}\sqrt{\frac{\pi^2}{6}}}$$

$$\sqrt[4]{\sqrt{4096}\,\sqrt{1729}\,\sqrt{\phi}\,\sqrt{\frac{\pi^2}{6}}} - \frac{2}{9}\log^2(2)\log(3) = -\frac{4}{9}\coth^{-1}(2)\left(2\coth^{-1}(3)\right)^2 + \sqrt[4]{\sqrt{1729}\,\sqrt{4096}\,\sqrt{\phi}\,\sqrt{\frac{\pi^2}{6}}}$$

$\log_b(x)$ is the base- b logarithm

$\coth^{-1}(x)$ is the inverse hyperbolic cotangent function

Series representations

$$\sqrt[4]{\sqrt{4096}\,\sqrt{1729}\,\sqrt{\phi}\,\sqrt{\frac{\pi^2}{6}}} - \frac{2}{9}\log^2(2)\log(3) = 2\times 2^{3/8}\sqrt[8]{\frac{1729\,\phi}{3}}\,\sqrt[4]{\pi} - \frac{2}{9}\left(2\,i\,\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\right)^2 \left(2\,i\,\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}}{k}\right) \text{ for } x < 0$$

$$\sqrt[4]{\sqrt{4096}\,\sqrt{1729}\,\sqrt{\phi}\,\sqrt{\frac{\pi^2}{6}}} - \frac{2}{9}\log^2(2)\log(3) = 2\times 2^{3/8}\sqrt[8]{\frac{1729\,\phi}{3}}\,\sqrt[4]{\pi} - \frac{2}{9}\left(\log(z_0) + \left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^2 \left(\log(z_0) + \left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}\right)$$

$$\sqrt[4]{\sqrt{4096}\,\sqrt{1729}\,\sqrt{\phi}\,\sqrt{\frac{\pi^2}{6}}} - \frac{2}{9}\log^2(2)\log(3) = 2\times 2^{3/8}\sqrt[8]{\frac{1729\,\phi}{3}}\,\sqrt[4]{\pi} - \frac{2}{9}\left(2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor + \log(z_0) - \sum_{k=1}^{\infty}\frac{(-1)^k\,(2-z_0)^k\,z_0^{-k}}{k}\right)^2 \left(2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor + \log(z_0) - \sum_{k=1}^{\infty}\frac{(-1)^k\,(3-z_0)^k\,z_0^{-k}}{k}\right)$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

Integral representations

$$\sqrt[4]{\sqrt{4096}\,\sqrt{1729}\,\sqrt{\phi}\,\sqrt{\frac{\pi^2}{6}}} - \frac{2}{9}\log^2(2)\log(3) = \frac{2}{9}\left(3\times 3^{7/8}\sqrt[8]{1729\left(1+\sqrt{5}\right)}\,\sqrt[4]{2\,\pi} - \left(\int_1^2\frac{1}{t}\,dt\right)^2\int_1^3\frac{1}{t}\,dt\right)$$

$$\sqrt[4]{\sqrt{4096}\,\sqrt{1729}\,\sqrt{\phi}\,\sqrt{\frac{\pi^2}{6}}} - \frac{2}{9}\log^2(2)\log(3) = \frac{1}{36\,\pi^3}\left(24\sqrt[4]{2}\,3^{7/8}\sqrt[8]{1729\left(1+\sqrt{5}\right)}\,\pi^{13/4} - i\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^2\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{2^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right) \text{ for } -1<\gamma<0$$

$\Gamma(x)$ is the gamma function

And:

3(((sqrt(4096)*sqrt(1729)*sqrt(golden ratio)*sqrt(Pi^2/6)))^(1/4)-2/9ln^2(2)ln(3))

Input

$$3\left(\sqrt[4]{\sqrt{4096}\,\sqrt{1729}\,\sqrt{\phi}\,\sqrt{\frac{\pi^2}{6}}}-\frac{2}{9}\log^2(2)\log(3)\right)$$

$\log(x)$ is the natural logarithm

ϕ is the golden ratio

Exact result

$$3\left(2\times 2^{3/8}\sqrt[4]{\pi}\,\sqrt[8]{\frac{1729\,\phi}{3}}-\frac{2}{9}\log^2(2)\log(3)\right)$$

Decimal approximation

24.000000366686459110136224321164601596328839998524958196435005925

…

24.00000036668645911…. ≈ 24

value that is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Expanded forms

$$6\times 2^{3/8}\sqrt[8]{\frac{1729}{6}+\frac{1729\sqrt{5}}{6}}\,\sqrt[4]{\pi}-\frac{2}{3}\log^2(2)\log(3)$$

$$2\times 3^{7/8}\sqrt[8]{1729\left(1+\sqrt{5}\right)}\,\sqrt[4]{2\pi}-\frac{2}{3}\log^2(2)\log(3)$$

Alternate forms

$$\frac{2}{3}\left(3\times 2^{3/8}\times 3^{7/8}\sqrt[4]{\pi}\,\sqrt[8]{1729\,\phi}-\log^2(2)\log(3)\right)$$

$$3\left(2\sqrt[8]{\frac{1729}{3}\left(1+\sqrt{5}\right)}\,\sqrt[4]{2\pi}-\frac{2}{9}\log^{2}(2)\log(3)\right)$$

$$\frac{2}{3}\left(3\times 3^{7/8}\sqrt[8]{1729\left(1+\sqrt{5}\right)}\,\sqrt[4]{2\pi}-\log^{2}(2)\log(3)\right)$$

Alternative representations

$$3\left(\sqrt[4]{\sqrt{4096}\,\sqrt{1729}\,\sqrt{\phi}\,\sqrt{\frac{\pi^{2}}{6}}}-\frac{2}{9}\log^{2}(2)\log(3)\right)=$$
$$3\left(-\frac{2}{9}\log_{e}(3)\log_{e}^{2}(2)+\sqrt[4]{\sqrt{1729}\,\sqrt{4096}\,\sqrt{\phi}\,\sqrt{\frac{\pi^{2}}{6}}}\right)$$

$$3\left(\sqrt[4]{\sqrt{4096}\,\sqrt{1729}\,\sqrt{\phi}\,\sqrt{\frac{\pi^{2}}{6}}}-\frac{2}{9}\log^{2}(2)\log(3)\right)=$$
$$3\left(-\frac{2}{9}\log(a)\log_{a}(3)\left(\log(a)\log_{a}(2)\right)^{2}+\sqrt[4]{\sqrt{1729}\,\sqrt{4096}\,\sqrt{\phi}\,\sqrt{\frac{\pi^{2}}{6}}}\right)$$

$$3\left(\sqrt[4]{\sqrt{4096}\ \sqrt{1729}\ \sqrt{\phi}\ \sqrt{\frac{\pi^2}{6}}}\ -\frac{2}{9}\log^2(2)\log(3)\right)=$$
$$3\left(-\frac{4}{9}\coth^{-1}(2)\left(2\coth^{-1}(3)\right)^2+\sqrt[4]{\sqrt{1729}\ \sqrt{4096}\ \sqrt{\phi}\ \sqrt{\frac{\pi^2}{6}}}\right)$$

$\log_b(x)$ is the base- b logarithm

$\coth^{-1}(x)$ is the inverse hyperbolic cotangent function

Series representations

$$3\left(\sqrt[4]{\sqrt{4096}\ \sqrt{1729}\ \sqrt{\phi}\ \sqrt{\frac{\pi^2}{6}}}\ -\frac{2}{9}\log^2(2)\log(3)\right)=3\left(2\times 2^{3/8}\sqrt[8]{\frac{1729\,\phi}{3}}\ \sqrt[4]{\pi}\ -\frac{2}{9}\left(2\,i\,\pi\left\lfloor\frac{\arg(2-x)}{2\,\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(2-x)^k\,x^{-k}}{k}\right)^2\left(2\,i\,\pi\left\lfloor\frac{\arg(3-x)}{2\,\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(3-x)^k\,x^{-k}}{k}\right)\right)\quad\text{for } x<0$$

$$3\left(\sqrt[4]{\sqrt{4096}\ \sqrt{1729}\ \sqrt{\phi}\ \sqrt{\frac{\pi^2}{6}}}\ -\frac{2}{9}\log^2(2)\log(3)\right)=3\left(2\times 2^{3/8}\sqrt[8]{\frac{1729\,\phi}{3}}\ \sqrt[4]{\pi}\ -\frac{2}{9}\left(\log(z_0)+\left\lfloor\frac{\arg(2-z_0)}{2\,\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(2-z_0)^k\,z_0^{-k}}{k}\right)^2\left(\log(z_0)+\left\lfloor\frac{\arg(3-z_0)}{2\,\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(3-z_0)^k\,z_0^{-k}}{k}\right)\right)$$

$$3\left(\sqrt[4]{\sqrt{4096}\ \sqrt{1729}\ \sqrt{\phi}\ \sqrt{\frac{\pi^2}{6}}}\ -\frac{2}{9}\log^2(2)\log(3)\right)=3\left(2\times 2^{3/8}\ \sqrt[8]{\frac{1729\,\phi}{3}}\ \sqrt[4]{\pi}\ -\right.$$

$$\frac{2}{9}\left(2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(2-z_0)^k\,z_0^{-k}}{k}\right)^2$$

$$\left.\left(2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(3-z_0)^k\,z_0^{-k}}{k}\right)\right)$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

Integral representations

$$3\left(\sqrt[4]{\sqrt{4096}\ \sqrt{1729}\ \sqrt{\phi}\ \sqrt{\frac{\pi^2}{6}}}\ -\frac{2}{9}\log^2(2)\log(3)\right)=$$

$$\frac{2}{3}\left(3\times 3^{7/8}\ \sqrt[8]{1729\left(1+\sqrt{5}\right)}\ \sqrt[4]{2\,\pi}\ -\left(\int_1^2\frac{1}{t}\,dt\right)^2\int_1^3\frac{1}{t}\,dt\right)$$

$$3\left(\sqrt[4]{\sqrt{4096}\ \sqrt{1729}\ \sqrt{\phi}\ \sqrt{\frac{\pi^2}{6}}}\ -\frac{2}{9}\log^2(2)\log(3)\right)=$$

$$\frac{1}{12\,\pi^3}\left(24\ \sqrt[4]{2}\ 3^{7/8}\ \sqrt[8]{1729\left(1+\sqrt{5}\right)}\ \pi^{13/4}-i\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^2\right.$$

$$\left.\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{2^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)\quad\text{for } -1<\gamma<0$$

$\Gamma(x)$ is the gamma function

We analyze the following expression:

1/12(((((4096)^(1/2)+(1729)^(1/2)-(Golden Ratio)^(1/2)+(zeta(2))^(1/2) - Pi^2))))

Input

$$\frac{1}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)$$

$\zeta(s)$ is the Riemann zeta function

ϕ is the golden ratio

Exact result

$$\frac{1}{12}\left(-\sqrt{\phi}+64+\sqrt{1729}+\frac{\pi}{\sqrt{6}}-\pi^2\right)$$

Decimal approximation

7.9768476293451682002281110069607509053152809876260254434783838603…

7.9768476293451682…. ≈ 8

value that is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 8 "modes" corresponding to the physical vibrations of a superstring.

Property

$\frac{1}{12}\left(64+\sqrt{1729}-\sqrt{\phi}+\frac{\pi}{\sqrt{6}}-\pi^2\right)$ is a transcendental number

Expanded form

$$\frac{16}{3}+\frac{\sqrt{1729}}{12}-\frac{1}{12}\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)}+\frac{\pi}{12\sqrt{6}}-\frac{\pi^2}{12}$$

Alternate forms

$$\frac{1}{12}\left(64+\sqrt{1729}-\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)}+\frac{\pi}{\sqrt{6}}-\pi^2\right)$$

$$\frac{1}{72}\left(384+6\sqrt{1729}-3\sqrt{2\left(1+\sqrt{5}\right)}+\sqrt{6}\,\pi-6\pi^2\right)$$

$$-\frac{\sqrt{6\phi}+\sqrt{6}\left(-64-\sqrt{1729}\right)-\pi+\sqrt{6}\,\pi^2}{12\sqrt{6}}$$

Alternative representations

$$\frac{1}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=\frac{1}{12}\left(\sqrt{1729}+\sqrt{4096}-\sqrt{\phi}-\pi^2+\sqrt{\zeta(2,1)}\right)$$

$$\frac{1}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=\frac{1}{12}\left(\sqrt{1729}+\sqrt{4096}-\sqrt{\phi}-\pi^2+\sqrt{S_{1,1}(1)}\right)$$

$$\frac{1}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=\frac{1}{12}\left(\sqrt{1729}+\sqrt{4096}-\sqrt{\phi}-\pi^2+\sqrt{-\frac{\operatorname{Li}_2(-1)}{\frac{1}{2}}}\right)$$

$\zeta(s,a)$ is the generalized Riemann zeta function

$S_{n,p}(x)$ is the Nielsen generalized polylogarithm function

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations

$$\frac{1}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=$$
$$\frac{16}{3}+\frac{\sqrt{1729}}{12}-\frac{\sqrt{\phi}}{12}-\frac{\pi^2}{12}+\frac{1}{12}\sqrt{\sum_{k=1}^{\infty}\frac{1}{k^2}}$$

$$\frac{1}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=$$
$$\frac{16}{3}+\frac{\sqrt{1729}}{12}-\frac{\sqrt{\phi}}{12}-\frac{\pi^2}{12}+\frac{\sqrt{-\sum_{k=1}^{\infty}\frac{(-1)^k}{k^2}}}{6\sqrt{2}}$$

$$\frac{1}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=$$
$$\frac{16}{3}+\frac{\sqrt{1729}}{12}-\frac{\sqrt{\phi}}{12}-\frac{\pi^2}{12}+\frac{\sqrt{\sum_{k=0}^{\infty}\frac{1}{(1+2k)^2}}}{6\sqrt{3}}$$

Integral representations

$$\frac{1}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=$$
$$\frac{16}{3}+\frac{\sqrt{1729}}{12}-\frac{\sqrt{\phi}}{12}-\frac{\pi^2}{12}+\frac{1}{12}\sqrt{\frac{1}{\Gamma(2)}\int_0^{\infty}\frac{t}{-1+e^t}\,dt}$$

$$\frac{1}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=$$
$$\frac{16}{3}+\frac{\sqrt{1729}}{12}-\frac{\sqrt{\phi}}{12}-\frac{\pi^2}{12}+\frac{\sqrt{\frac{1}{\Gamma(2)}\int_0^{\infty}t\,\mathrm{csch}(t)\,dt}}{6\sqrt{6}}$$

$$\frac{1}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right) =$$

$$\frac{16}{3}+\frac{\sqrt{1729}}{12}-\frac{\sqrt{\phi}}{12}-\frac{\pi^2}{12}+\frac{\sqrt{\frac{1}{\Gamma(3)}\int_0^\infty t^2 \operatorname{csch}^2(t)\,dt}}{6\sqrt{2}}$$

$\Gamma(x)$ is the gamma function

$\operatorname{csch}(x)$ is the hyperbolic cosecant function

We obtain also:

3*(1/12(((((4096)^(1/2)+(1729)^(1/2)-(Golden Ratio)^(1/2)+(zeta(2))^(1/2) - Pi^2)))))

Input

$$3\left(\frac{1}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)\right)$$

$\zeta(s)$ is the Riemann zeta function

ϕ is the golden ratio

Exact result

$$\frac{1}{4}\left(-\sqrt{\phi}+64+\sqrt{1729}+\frac{\pi}{\sqrt{6}}-\pi^2\right)$$

Decimal approximation

23.930542888035504600684333020882252715945842962878076330435151580
…

23.9305428880355…. ≈ 24

value that is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Property

$\frac{1}{4}\left(64+\sqrt{1729}-\sqrt{\phi}+\frac{\pi}{\sqrt{6}}-\pi^2\right)$ is a transcendental number

Expanded form

$$16+\frac{\sqrt{1729}}{4}-\frac{1}{4}\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)}+\frac{\pi}{4\sqrt{6}}-\frac{\pi^2}{4}$$

Alternate forms

$$\frac{1}{4}\left(64+\sqrt{1729}-\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)}+\frac{\pi}{\sqrt{6}}-\pi^2\right)$$

$$\frac{1}{24}\left(384+6\sqrt{1729}-3\sqrt{2\left(1+\sqrt{5}\right)}+\sqrt{6}\,\pi-6\pi^2\right)$$

$$-\frac{\sqrt{6\phi}+\sqrt{6}\left(-64-\sqrt{1729}\right)-\pi+\sqrt{6}\,\pi^2}{4\sqrt{6}}$$

Alternative representations

$$\frac{3}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=\frac{3}{12}\left(\sqrt{1729}+\sqrt{4096}-\sqrt{\phi}-\pi^2+\sqrt{\zeta(2,1)}\right)$$

$$\frac{3}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=\frac{3}{12}\left(\sqrt{1729}+\sqrt{4096}-\sqrt{\phi}-\pi^2+\sqrt{S_{1,1}(1)}\right)$$

$$\frac{3}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=$$
$$\frac{3}{12}\left(\sqrt{1729}+\sqrt{4096}-\sqrt{\phi}-\pi^2+\sqrt{-\frac{\mathrm{Li}_2(-1)}{\frac{1}{2}}}\right)$$

$\zeta(s,\, a)$ is the generalized Riemann zeta function

$S_{n,p}(x)$ is the Nielsen generalized polylogarithm function

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations

$$\frac{3}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=$$
$$16+\frac{\sqrt{1729}}{4}-\frac{\sqrt{\phi}}{4}-\frac{\pi^2}{4}+\frac{1}{4}\sqrt{\sum_{k=1}^{\infty}\frac{1}{k^2}}$$

$$\frac{3}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=$$
$$16+\frac{\sqrt{1729}}{4}-\frac{\sqrt{\phi}}{4}-\frac{\pi^2}{4}+\frac{\sqrt{-\sum_{k=1}^{\infty}\frac{(-1)^k}{k^2}}}{2\sqrt{2}}$$

$$\frac{3}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=$$
$$16+\frac{\sqrt{1729}}{4}-\frac{\sqrt{\phi}}{4}-\frac{\pi^2}{4}+\frac{\sqrt{\sum_{k=0}^{\infty}\frac{1}{(1+2k)^2}}}{2\sqrt{3}}$$

Integral representations

$$\frac{3}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=$$
$$16+\frac{\sqrt{1729}}{4}-\frac{\sqrt{\phi}}{4}-\frac{\pi^2}{4}+\frac{1}{4}\sqrt{\frac{1}{\Gamma(2)}\int_0^\infty \frac{t}{-1+e^t}\,dt}$$

$$\frac{3}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=$$
$$16+\frac{\sqrt{1729}}{4}-\frac{\sqrt{\phi}}{4}-\frac{\pi^2}{4}+\frac{\sqrt{\frac{1}{\Gamma(2)}\int_0^\infty t\,\operatorname{csch}(t)\,dt}}{2\sqrt{6}}$$

$$\frac{3}{12}\left(\sqrt{4096}+\sqrt{1729}-\sqrt{\phi}+\sqrt{\zeta(2)}-\pi^2\right)=$$
$$16+\frac{\sqrt{1729}}{4}-\frac{\sqrt{\phi}}{4}-\frac{\pi^2}{4}+\frac{\sqrt{\frac{1}{\Gamma(3)}\int_0^\infty t^2\,\operatorname{csch}^2(t)\,dt}}{2\sqrt{2}}$$

$\Gamma(x)$ is the gamma function

$\operatorname{csch}(x)$ is the hyperbolic cosecant function

We analyze the following expression:

(sqrt4096 + sqrt1729-φ+Pi^2/6)

Input

$$\sqrt{4096}+\sqrt{1729}-\phi+\frac{\pi^2}{6}$$

ϕ is the golden ratio

Result

$$-\phi + 64 + \sqrt{1729} + \frac{\pi^2}{6}$$

Decimal approximation

105.60814585068191347854803751775203415084405935443013544926931608

…

105.60814585….

Property

$64 + \sqrt{1729} - \phi + \frac{\pi^2}{6}$ is a transcendental number

Alternate forms

$$\frac{1}{6}\left(381 - 3\sqrt{5} + 6\sqrt{1729} + \pi^2\right)$$

$$\frac{1}{6}\left(-6\phi + 6\left(64 + \sqrt{1729}\right) + \pi^2\right)$$

$$64 + \sqrt{1729} + \frac{1}{2}\left(-1 - \sqrt{5}\right) + \frac{\pi^2}{6}$$

Expanded form

$$\frac{127}{2} - \frac{\sqrt{5}}{2} + \sqrt{1729} + \frac{\pi^2}{6}$$

Series representations

$$\sqrt{4096}+\sqrt{1729}-\phi+\frac{\pi^2}{6}=$$
$$-\phi+\frac{\pi^2}{6}+\sum_{k=0}^{\infty}786\,240^{-k}\binom{\frac{1}{2}}{k}\left(455^k\sqrt{1728}+192^k\sqrt{4095}\right)$$

$$\sqrt{4096}+\sqrt{1729}-\phi+\frac{\pi^2}{6}=$$
$$-\phi+\frac{\pi^2}{6}+\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)_k\left(\left(-\frac{1}{1728}\right)^k\sqrt{1728}+\left(-\frac{1}{4095}\right)^k\sqrt{4095}\right)}{k!}$$

$$\sqrt{4096}+\sqrt{1729}-\phi+\frac{\pi^2}{6}=$$
$$-\phi+\frac{\pi^2}{6}+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left((1729-z_0)^k+(4096-z_0)^k\right)z_0^{-k}}{k!}$$
$$\text{for (not } (z_0\in\mathbb{R}\text{ and }-\infty<z_0\le 0))$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

From which:

1/3(1/5((sqrt4096 + sqrt1729-φ+Pi^2/6)-Φ))+1

Input

$$\frac{1}{3}\left(\frac{1}{5}\left(\left(\sqrt{4096}+\sqrt{1729}-\phi+\frac{\pi^2}{6}\right)-\Phi\right)\right)+1$$

ϕ is the golden ratio

Φ is the golden ratio conjugate

Result

$$\frac{1}{15}\left(-\Phi-\phi+64+\sqrt{1729}+\frac{\pi^2}{6}\right)+1$$

Exact form

$$\frac{1}{15}\left(-2\,\phi+65+\sqrt{1729}+\frac{\pi^2}{6}\right)+1$$

Decimal approximation

7.9993407907954679086895633788924264022082500116416248391422578306

…

7.9993407907954679…. ≈ 8

value that is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 8 "modes" corresponding to the physical vibrations of a superstring.

Property

$1+\frac{1}{15}\left(64+\sqrt{1729}-\phi-\Phi+\frac{\pi^2}{6}\right)$ is a transcendental number

Alternate forms

$$\frac{1}{90}\left(-6\,\Phi+471-3\sqrt{5}+6\sqrt{1729}+\pi^2\right)$$

$$\frac{1}{90}\left(-6\,\Phi-6\,\phi+6\left(79+\sqrt{1729}\right)+\pi^2\right)$$

$$-\frac{\Phi}{15}-\frac{\phi}{15}+\frac{79}{15}+\frac{\sqrt{1729}}{15}+\frac{\pi^2}{90}$$

Expanded form

$$-\frac{\Phi}{15}+\frac{157}{30}-\frac{1}{6\sqrt{5}}+\frac{\sqrt{1729}}{15}+\frac{\pi^2}{90}$$

And:

3*(1/3(1/5((sqrt4096 + sqrt1729-φ+Pi^2/6)-Φ))+1)

Input

$$3\left(\frac{1}{3}\left(\frac{1}{5}\left(\left(\sqrt{4096}+\sqrt{1729}-\phi+\frac{\pi^2}{6}\right)-\Phi\right)\right)+1\right)$$

ϕ is the golden ratio

Φ is the golden ratio conjugate

Result

$$3\left(\frac{1}{15}\left(-\Phi-\phi+64+\sqrt{1729}+\frac{\pi^2}{6}\right)+1\right)$$

Exact form

$$\frac{1}{30}\left(6\left(79-\sqrt{5}+\sqrt{1729}\right)+\pi^2\right)$$

Decimal approximation

23.998022372386403726068690136677279206624750034924874517426773491

…

23.9980223723864…. ≈ 24

value that is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Property

$3\left(1+\frac{1}{15}\left(64+\sqrt{1729}-\phi-\Phi+\frac{\pi^2}{6}\right)\right)$ is a transcendental number

Alternate forms

$$\frac{1}{30}\left(-6\,\Phi+471-3\sqrt{5}+6\sqrt{1729}+\pi^2\right)$$

$$\frac{1}{30}\left(-6\,\Phi-6\,\phi+6\left(79+\sqrt{1729}\right)+\pi^2\right)$$

$$-\frac{\Phi}{5}-\frac{\phi}{5}+\frac{79}{5}+\frac{\sqrt{1729}}{5}+\frac{\pi^2}{30}$$

Expanded form

$$-\frac{\Phi}{5}+\frac{157}{10}-\frac{1}{2\sqrt{5}}+\frac{\sqrt{1729}}{5}+\frac{\pi^2}{30}$$

Formula for calculating the radius of a sphere knowing the volume:

From

$$V=\frac{4}{3}\pi r^3$$

we obtain:

$$r=\sqrt[3]{\frac{3V}{4\pi}}$$

We calculate the measure of the radius of a sphere whose volume is equal to 2144.66058485 m^3. We have:

$$r = \sqrt[3]{\frac{3V}{4\pi}} = \sqrt[3]{\frac{3\times(2144{,}66058485)}{4\times 3{,}141592653}} = \sqrt[3]{\frac{6.433{,}98175455}{12{,}566370612}} \cong 8$$

We note that $4096 \times \frac{\pi}{2} \approx 6433.9817545518965$ and $4 \times 3{,}141592653 = 4\pi$.

Thus, we obtain:

$$r = \sqrt[3]{\frac{4096\,\frac{\pi}{2}}{4\pi}} = 8 \implies$$

$$\Rightarrow \sqrt{\frac{\pi^2}{6} \times \frac{\phi}{\sqrt{1729}} \sqrt{\left(4096 \times \frac{1}{\phi} \times \frac{1}{\zeta(2)}\right)\left(1729 \times \frac{1}{\phi} \times \frac{1}{\zeta(2)}\right)}}$$

$= 8$

8 value that is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 8 "modes" corresponding to the physical vibrations of a superstring.

Now, we have that the two volumes (cube and sphere) are equal to:

$$V_c = l^3 = (2 \times 8)^3 = 16^3 = 4096$$

$$V = \frac{4}{3}\pi r^3 = 2144.66058485$$

The ratio between the two volumes is equal to:

(4096/(2144.66058485))

Input interpretation

$$\frac{4096}{2144.66058485}$$

Result

1.9098593171033070007044942498934740004484304447956572889221762768

…

1.9098593171033…. ≈

≈ $\sqrt{\frac{6}{\zeta(2)}} \approx 1.90985931710 27440$

From which, after some calculations, we arrive at the following expressions:

x*((4096/(2144.66058485))^1/3) = 2

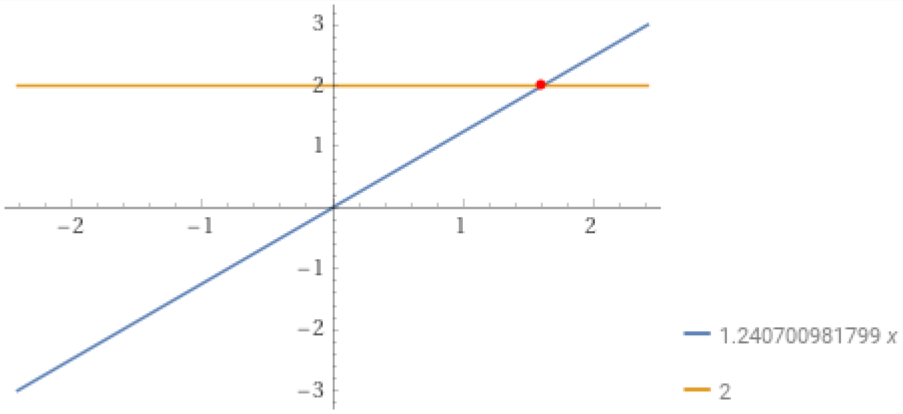
Input interpretation

$$x \sqrt[3]{\frac{4096}{2144.66058485}} = 2$$

Result

$1.240700981799\, x = 2$

Plot



Alternate form

$1.240700981799\,x - 2 = 0$

Solution

$x \approx 1.611991954016$

1.611991954016 ≈ φ = 1.61803398….

Logarithmic form

$$\log_{1.90985931710}(x) + \frac{\log_{1.90985931710}\left(\frac{4096}{2144.66058485}\right)}{3} = \log_{1.90985931710}(2)$$

$\log_b(x)$ is the base- b logarithm

Thus, we obtain the following expression:

1.611991954016((4096/(2144.66058485))^1/3)

Input interpretation

$$1.611991954016\sqrt[3]{\frac{4096}{2144.66058485}}$$

Result

2.00000000000…

2

From which:

(1.611991954016((4096/(2144.66058485))^1/3))^3

Input interpretation

$$\left(1.611991954016\sqrt[3]{\frac{4096}{2144.66058485}}\right)^3$$

Result

7.9999999999953659650285544042085803753638187257983168506217255480

…

7.99999… ≈ 8

value that is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 8 "modes" corresponding to the physical vibrations of a superstring.

and:

3((1.611991954016((4096/(2144.66058485))^1/3))^3)

Input interpretation

$$3\left(1.611991954016\sqrt[3]{\frac{4096}{2144.66058485}}\right)^3$$

Result

23.999999999986097895085663212625741126091456177394950551865176644

…

23.99999… ≈ 24 value that is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

We note that, inserting the exact value of the Golden Ratio in the previous expression, we obtain:

((1.61803398)((4096/(2144.66058485))^1/3))

Input interpretation

$$1.61803398\sqrt[3]{\frac{4096}{2144.66058485}}$$

Result

2.00749635…

2.00749635… ≈ 2

From the following expression, containing the ratio between the two volumes, after some calculations, we obtain:

1+1/(1+(1/2(1/Pi(4096/(2144.66058485))+1/3(4096/(2144.66058485)))))

Input interpretation

$$1+\frac{1}{1+\frac{1}{2}\left(\frac{1}{\pi}\times\frac{4096}{2144.66058485}+\frac{1}{3}\times\frac{4096}{2144.66058485}\right)}$$

Result

1.616418895313…

1.616418895313…. ≈ φ = Golden Ratio

Alternative representations

$$1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{\pi\,2144.660584850000}+\frac{4096}{3\times2144.660584850000}\right)}=$$

$$1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{3\times2144.660584850000}+\frac{4096}{2144.660584850000\,(180\,°)}\right)}$$

$$1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{\pi\, 2144.660584850000}+\frac{4096}{3\times 2144.660584850000}\right)}=$$
$$1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{3\times 2144.660584850000}+\frac{4096}{2144.660584850000\,(-i\log(-1))}\right)}$$

$$1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{\pi\, 2144.660584850000}+\frac{4096}{3\times 2144.660584850000}\right)}=$$
$$1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{3\times 2144.660584850000}+\frac{4096}{2144.660584850000\cos^{-1}(-1)}\right)}$$

$\log(x)$ is the natural logarithm

i is the imaginary unit

$\cos^{-1}(x)$ is the inverse cosine function

Series representations

$$1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{\pi\, 2144.660584850000}+\frac{4096}{3\times 2144.660584850000}\right)}=$$
$$1+\frac{1}{1.3183098861838845+\frac{0.2387324146379134}{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}}$$

$$1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{\pi\, 2144.660584850000}+\frac{4096}{3\times 2144.660584850000}\right)}=$$
$$1+\frac{1}{1.3183098861838845+\frac{0.4774648292758268}{-1.000000000000000+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}}}$$

$$1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{\pi\,2144.660584850000}+\frac{4096}{3\times 2144.660584850000}\right)}=$$
$$1+\frac{1}{1.3183098861838845+\frac{0.9549296585516535}{x+2\sum_{k=1}^{\infty}\frac{\sin(k\,x)}{k}}} \quad \text{for } (x\in\mathbb{R} \text{ and } x>0)$$

$\binom{n}{m}$ is the binomial coefficient

$\mathbb{R}$ is the set of real numbers

Integral representations

$$1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{\pi\,2144.660584850000}+\frac{4096}{3\times 2144.660584850000}\right)}=$$
$$1+\frac{1}{1.3183098861838845+\frac{0.4774648292758268}{\int_0^{\infty}\frac{1}{1+t^2}\,dt}}$$

$$1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{\pi\,2144.660584850000}+\frac{4096}{3\times 2144.660584850000}\right)}=$$
$$1+\frac{1}{1.3183098861838845+\frac{0.2387324146379134}{\int_0^{1}\sqrt{1-t^2}\,dt}}$$

$$1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{\pi\,2144.660584850000}+\frac{4096}{3\times 2144.660584850000}\right)}=$$
$$1+\frac{1}{1.3183098861838845+\frac{0.4774648292758268}{\int_0^{\infty}\frac{\sin(t)}{t}\,dt}}$$

From which, we can also get, dividing everything by 10^{35}:

(1+1/(1+(1/2(1/Pi(4096/(2144.66058485))+1/3(4096/(2144.66058485))))))*10^-35

Input interpretation

$$\frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{1}{\pi}\times\frac{4096}{2144.66058485}+\frac{1}{3}\times\frac{4096}{2144.66058485}\right)}}{10^{35}}$$

Result

$1.616418895313\ldots\times 10^{-35}$

$1.616418895313\ldots*10^{-35} \approx$ Planck length $= 1.616255*10^{-35}$ m

Alternative representations

$$\frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{\pi\, 2144.660584850000}+\frac{4096}{3\times 2144.660584850000}\right)}}{10^{35}} = \frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{3\times 2144.660584850000}+\frac{4096}{2144.660584850000\,(180\,°)}\right)}}{10^{35}}$$

$$\frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{\pi\, 2144.660584850000}+\frac{4096}{3\times 2144.660584850000}\right)}}{10^{35}} = \frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{3\times 2144.660584850000}+\frac{4096}{2144.660584850000\,(-i\log(-1))}\right)}}{10^{35}}$$

$$\frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{\pi\, 2144.660584850000}+\frac{4096}{3\times 2144.660584850000}\right)}}{10^{35}} = \frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{3\times 2144.660584850000}+\frac{4096}{2144.660584850000\cos^{-1}(-1)}\right)}}{10^{35}}$$

$\log(x)$ is the natural logarithm

i is the imaginary unit

$\cos^{-1}(x)$ is the inverse cosine function

Series representations

$$\frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{\pi\,2144.660584850000}+\frac{4096}{3\times 2144.660584850000}\right)}}{10^{35}} = \left(1.000000000000\left(1.8108975525396\times 10^{-36}+1.7585469929947\times 10^{-35}\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)\right)\Big/\left(0.1810897552540+1.000000000000\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)$$

$$\frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{\pi\,2144.660584850000}+\frac{4096}{3\times 2144.660584850000}\right)}}{10^{35}} = -\left(\left(1.000000000000\left(1.3963674824868\times 10^{-35}-1.7585469929947\times 10^{-35}\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)\right)\Big/\left(-0.6378204894921+1.000000000000\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)\right)$$

$$\frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{4096}{\pi\,2144.660584850000}+\frac{4096}{3\times 2144.660584850000}\right)}}{10^{35}} = \left(1.000000000000\left(7.243590210158\times 10^{-36}+1.7585469929947\times 10^{-35}\,x+3.517093985989\times 10^{-35}\sum_{k=1}^{\infty}\frac{\sin(k\,x)}{k}\right)\right)\Big/\left(0.7243590210158+1.000000000000\,x+2.000000000000\sum_{k=1}^{\infty}\frac{\sin(k\,x)}{k}\right)$$

for $(x \in \mathbb{R}$ and $x > 0)$

$\binom{n}{m}$ is the binomial coefficient

$\mathbb{R}$ is the set of real numbers

From the previous results and the value of the Cosmological Constant 1.1056 * 10^{-52} , we obtain:

2*(1/(((1+1/(1+(1/2(1/Pi(4096/(2144.66058485))+1/3(4096/(2144.66058485))))))*10^-35)*1/(sqrt(1.1056*10^-52))))^1/3-4

Input interpretation

$$2\sqrt[3]{\frac{1}{\frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{1}{\pi}\times\frac{4096}{2144.66058485}+\frac{1}{3}\times\frac{4096}{2144.66058485}\right)}}{10^{35}}\times\frac{1}{\sqrt{1.1056\times10^{-52}}}}}-4$$

Result

1728.92…

1728.92… ≈ 1729

This result is very near to the mass of candidate glueball $f_0(1710)$ scalar meson. Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve (1728 = 8^2 * 3^3). The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number, as it can be expressed as the sum of two cubes in two different ways ($10^3 + 9^3 = 12^3 + 1^3 = 1729$) and Ramanujan's recurring number)

And again, after some calculations:

(1/27((2*(1/(((1+1/(1+(1/2(1/Pi(4096/(2144.66058485))+1/3(4096/(2144.66058485))))))*10^-35)*1/(sqrt(1.1056*10^-52))))^1/3-4)-1))^2+1/π

Input interpretation

$$\left(\frac{1}{27}\left(\left(2\sqrt[3]{\frac{1}{\frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{1}{\pi}\times\frac{4096}{2144.66058485}+\frac{1}{3}\times\frac{4096}{2144.66058485}\right)}}{10^{35}}\times\frac{1}{\sqrt{1.1056\times10^{-52}}}}}-4\right)-1\right)\right)^{2}+\frac{1}{\pi}$$

Result

4095.94…

4095.94… ≈ 4096 = 64^2 , (Ramanujan Recurring Number) that multiplied by 2 give 8192, indeed:

The total amplitude vanishes for gauge group SO(8192), while the vacuum energy is negative and independent of the gauge group. The vacuum energy and dilaton tadpole to lowest non-trivial order for the open bosonic string. While the vacuum energy is non-zero and independent of the gauge group, the dilaton tadpole is zero for a unique choice of gauge group, SO(2^{13}) i.e. SO(8192). (From: “Dilaton Tadpole for the Open Bosonic String “ Michael R. Douglas and Benjamin Grinstein - September 2,1986)

From the sum of the two previous expressions/results, we obtain:

1/25*1/144(4095.94+2*(1/(((1+1/(1+(1/2(1/Pi(4096/(2144.66058485))+1/3(4096/(2144.66058485))))))*10^-35)*1/(sqrt(1.1056*10^-52))))^1/3-4)

Input interpretation

$$\frac{1}{25}\times\frac{1}{144}\left(4095.94+2\sqrt[3]{\frac{1}{\frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{1}{\pi}\times\frac{4096}{2144.66058485}+\frac{1}{3}\times\frac{4096}{2144.66058485}\right)}}{10^{35}}\times\frac{1}{\sqrt{1.1056\times10^{-52}}}}}-4\right)$$

Result

1.6180164972188523146407158667522027264019618541901751768064004840

...

1.61801649721885…≈ φ

Furthermore, we obtain also:

(2*(1/(((1+1/(1+(1/2(1/Pi(4096/(2144.66058485))+1/3(4096/(2144.66058485))))))*10^-35)*1/(sqrt(1.1056*10^-52))))^1/3-4)^1/15+(MRB const)^(1-1/(4π)+π)

Input interpretation

$$\sqrt[15]{2\sqrt[3]{\frac{1}{\frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{1}{\pi}\times\frac{4096}{2144.66058485}+\frac{1}{3}\times\frac{4096}{2144.66058485}\right)}}{10^{35}}\times\frac{1}{\sqrt{1.1056\times10^{-52}}}}}-4}+C_{\mathrm{MRB}}^{1-1/(4\pi)+\pi}$$

C_{MRB} is the MRB constant

Result

1.6449329147857988820400957688621502274860132321515933454737068437

...

1.644932914785798882… ≈ ζ(2) = $\pi^2/6$ = 1.644934

sqrt(6((2*(1/(((1+1/(1+(1/2(1/Pi(4096/(2144.66058485))+1/3(4096/(2144.66058485)))))))*10^-35)*1/(sqrt(1.1056*10^-52))))^1/3-4)^1/15+(MRB const)^(1-1/(4π)+π)))

Input interpretation

$$\sqrt{6\left(\sqrt[15]{2\sqrt[3]{\frac{1}{\frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{1}{\pi}\times\frac{4096}{2144.66058485}+\frac{1}{3}\times\frac{4096}{2144.66058485}\right)}}{10^{35}}\times\frac{1}{\sqrt{1.1056\times10^{-52}}}}}-4}+C_{\mathrm{MRB}}{}^{1-1/(4\pi)+\pi}\right)}$$

C_{MRB} is the MRB constant

Result

3.1415915534510200379694545764082866944755354123357394533942058662

...

3.14159155345102… ≈ π

And again:

((1/27((2*(1/(((1+1/(1+(1/2(1/Pi(4096/(2144.66058485))+1/3(4096/(2144.66058485))))))*10^-35)*1/(sqrt(1.1056*10^-52))))^1/3-4)-1))^2+1/π)^1/4

Input interpretation

$$\sqrt[4]{\left(\frac{1}{27}\left(\left(2\sqrt[3]{\frac{1}{\frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{1}{\pi}\times\frac{4096}{2144.66058485}+\frac{1}{3}\times\frac{4096}{2144.66058485}\right)}}{10^{35}}\times\frac{1}{\sqrt{1.1056\times10^{-52}}}}}-4\right)-1\right)\right)^2+\frac{1}{\pi}}$$

Result

7.99997…

7.99997… ≈ 8 value that is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 8 "modes" corresponding to the physical vibrations of a superstring

3(((1/27((2*(1/(((1+1/(1+(1/2(1/Pi(4096/(2144.66058485))+1/3(4096/(2144.66058485))))))*10^-35)*1/(sqrt(1.1056*10^-52))))^1/3-4)-1))^2+1/π)^1/4)

Input interpretation

$$3\left(\left(\frac{1}{27}\left(\left(2\left(1/\left(\frac{1+\frac{1}{1+\frac{1}{2}\left(\frac{1}{\pi}\times\frac{4096}{2144.66058485}+\frac{1}{3}\times\frac{4096}{2144.66058485}\right)}}{10^{35}}\times\frac{1}{\sqrt{1.1056\times10^{-52}}}\right)\right){}^\wedge(1/3)-4\right)-1\right)\right)^2+\frac{1}{\pi}\right){}^\wedge(1/4)$$

Result

23.9999…

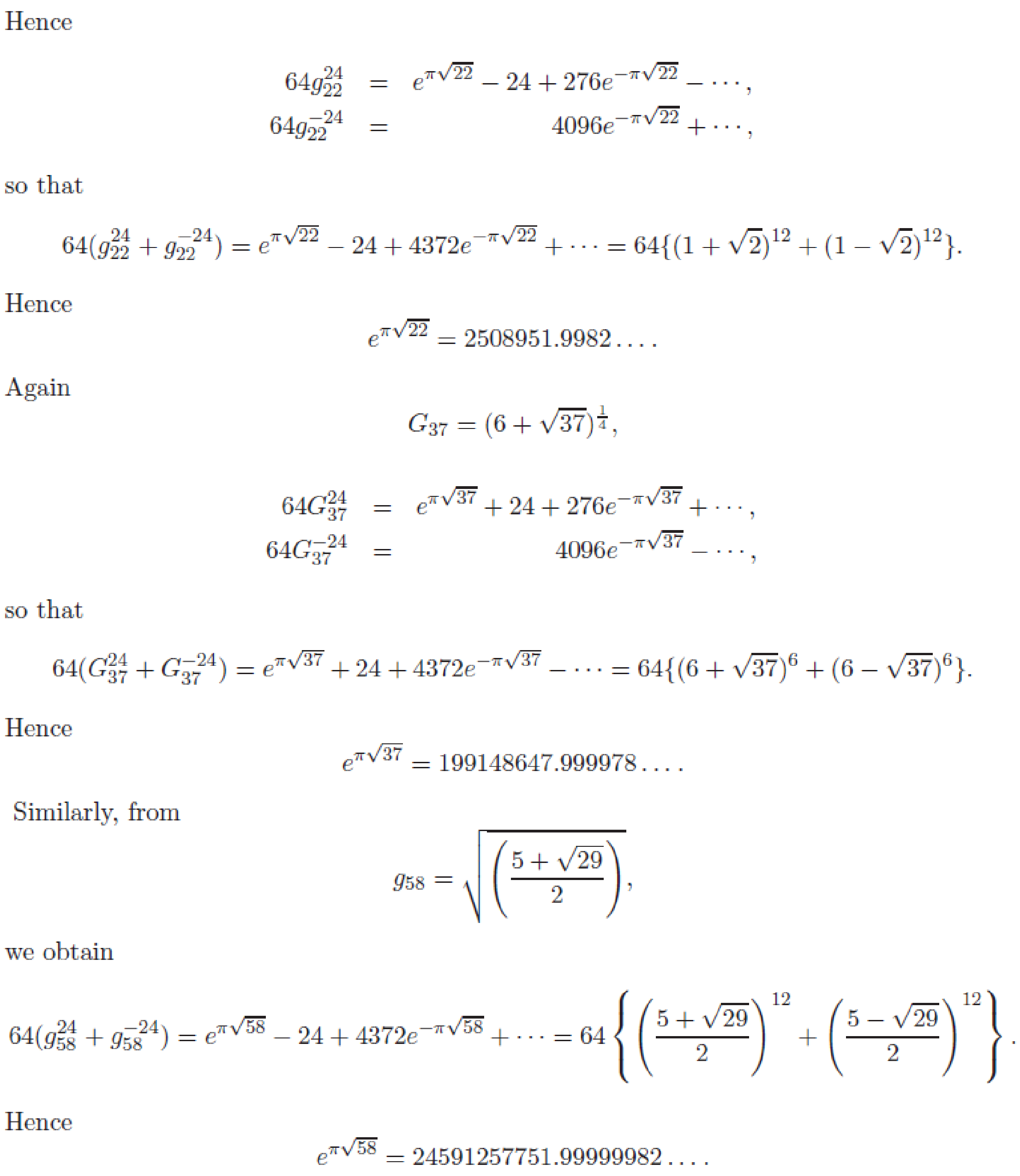
23.9999… ≈ 24 value that is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Appendix

From:

Modular equations and approximations to π - *Srinivasa Ramanujan* - Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

We have that:



Hence

$$\begin{aligned} 64g_{22}^{24} &= e^{\pi\sqrt{22}} - 24 + 276e^{-\pi\sqrt{22}} - \cdots, \\ 64g_{22}^{-24} &= \qquad\qquad 4096e^{-\pi\sqrt{22}} + \cdots, \end{aligned}$$

so that

$$64(g_{22}^{24} + g_{22}^{-24}) = e^{\pi\sqrt{22}} - 24 + 4372e^{-\pi\sqrt{22}} + \cdots = 64\{(1+\sqrt{2})^{12} + (1-\sqrt{2})^{12}\}.$$

Hence

$$e^{\pi\sqrt{22}} = 2508951.9982\ldots.$$

Again

$$G_{37} = (6+\sqrt{37})^{\frac{1}{4}},$$

$$\begin{aligned} 64G_{37}^{24} &= e^{\pi\sqrt{37}} + 24 + 276e^{-\pi\sqrt{37}} + \cdots, \\ 64G_{37}^{-24} &= \qquad\qquad 4096e^{-\pi\sqrt{37}} - \cdots, \end{aligned}$$

so that

$$64(G_{37}^{24} + G_{37}^{-24}) = e^{\pi\sqrt{37}} + 24 + 4372e^{-\pi\sqrt{37}} - \cdots = 64\{(6+\sqrt{37})^{6} + (6-\sqrt{37})^{6}\}.$$

Hence

$$e^{\pi\sqrt{37}} = 199148647.999978\ldots.$$

Similarly, from

$$g_{58} = \sqrt{\left(\frac{5+\sqrt{29}}{2}\right)},$$

we obtain

$$64(g_{58}^{24} + g_{58}^{-24}) = e^{\pi\sqrt{58}} - 24 + 4372e^{-\pi\sqrt{58}} + \cdots = 64\left\{\left(\frac{5+\sqrt{29}}{2}\right)^{12} + \left(\frac{5-\sqrt{29}}{2}\right)^{12}\right\}.$$

Hence

$$e^{\pi\sqrt{58}} = 24591257751.99999982\ldots.$$

We note that, with regard 4372, we can to obtain the following results:

27((4372)^1/2-2-1/2(((√(10-2√5) -2))⁄((√5-1))))+φ

Input

$$27\left(\sqrt{4372}-2-\frac{1}{2}\times\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)+\phi$$

ϕ is the golden ratio

Result

$$\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)$$

Decimal approximation

1729.0526944170905625170637208637148763684189306538457854815447023…

1729.0526944….

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = 8^2 * 3^3) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Alternate forms

$$\frac{1}{8}\left(-27\sqrt{5\left(10-2\sqrt{5}\right)}+58\sqrt{5}+432\sqrt{1093}-27\sqrt{2\left(5-\sqrt{5}\right)}-374\right)$$

$$\phi-54+54\sqrt{1093}+\frac{27}{4}\left(1+\sqrt{5}-\sqrt{2\left(5+\sqrt{5}\right)}\right)$$

$$\phi - 54 + 54\sqrt{1093} - \frac{27\left(\sqrt{10 - 2\sqrt{5}} - 2\right)}{2\left(\sqrt{5} - 1\right)}$$

Minimal polynomial

$$256\,x^8 + 95\,744\,x^7 - 3\,248\,750\,080\,x^6 - 914\,210\,725\,504\,x^5 + 15\,498\,355\,554\,921\,184\,x^4 + 2\,911\,478\,392\,539\,914\,656\,x^3 - 32\,941\,144\,911\,224\,677\,091\,680\,x^2 - 3\,092\,528\,914\,069\,760\,354\,714\,456\,x + 26\,320\,050\,609\,744\,039\,027\,169\,013\,041$$

Expanded forms

$$-\frac{187}{4} + \frac{29\sqrt{5}}{4} + 54\sqrt{1093} - \frac{27}{8}\sqrt{10 - 2\sqrt{5}} - \frac{27}{8}\sqrt{5\left(10 - 2\sqrt{5}\right)}$$

$$-\frac{107}{2} + \frac{\sqrt{5}}{2} + 54\sqrt{1093} + \frac{27}{\sqrt{5} - 1} - \frac{27\sqrt{10 - 2\sqrt{5}}}{2\left(\sqrt{5} - 1\right)}$$

Series representations

$$27\left(\sqrt{4372} - 2 - \frac{\sqrt{10 - 2\sqrt{5}} - 2}{\left(\sqrt{5} - 1\right)2}\right) + \phi = \left(162 - 108\sqrt{1093} - 2\phi - 108\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} + 108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} + 2\phi\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} - 27\sqrt{9 - 2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9 - 2\sqrt{5}\right)^{-k}\right) \Bigg/ \left(2\left(-1 + \sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k}\right)\right)$$

$$27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$

$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+\right.$$
$$108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+2\phi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$
$$\left.27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)\Big/$$
$$\left(2\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

$$27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$

$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+\right.$$
$$108\sqrt{1093}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+$$
$$2\phi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}-$$
$$\left.27\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/$$
$$\left(2\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

Or:

27((4096+276)^1/2-2-1/2(((√(10-2√5) -2))⁄((√5-1))))+φ

Input

$$27\left(\sqrt{4096+276}-2-\frac{1}{2}\times\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)+\phi$$

ϕ is the golden ratio

Result

$$\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)$$

Decimal approximation

1729.0526944170905625170637208637148763684189306538457854815447023 …

1729.0526944…. as above

Alternate forms

$$\frac{1}{8}\left(-27\sqrt{5\left(10-2\sqrt{5}\right)}+58\sqrt{5}+432\sqrt{1093}-27\sqrt{2\left(5-\sqrt{5}\right)}-374\right)$$

$$\phi-54+54\sqrt{1093}+\frac{27}{4}\left(1+\sqrt{5}-\sqrt{2\left(5+\sqrt{5}\right)}\right)$$

$$\phi-54+54\sqrt{1093}-\frac{27\left(\sqrt{10-2\sqrt{5}}-2\right)}{2\left(\sqrt{5}-1\right)}$$

Minimal polynomial

$$256\,x^8 + 95\,744\,x^7 - 3\,248\,750\,080\,x^6 - 914\,210\,725\,504\,x^5 + 15\,498\,355\,554\,921\,184\,x^4 + 2\,911\,478\,392\,539\,914\,656\,x^3 - 32\,941\,144\,911\,224\,677\,091\,680\,x^2 - 3\,092\,528\,914\,069\,760\,354\,714\,456\,x + 26\,320\,050\,609\,744\,039\,027\,169\,013\,041$$

Expanded forms

$$-\frac{187}{4} + \frac{29\sqrt{5}}{4} + 54\sqrt{1093} - \frac{27}{8}\sqrt{10 - 2\sqrt{5}} - \frac{27}{8}\sqrt{5\left(10 - 2\sqrt{5}\right)}$$

$$-\frac{107}{2} + \frac{\sqrt{5}}{2} + 54\sqrt{1093} + \frac{27}{\sqrt{5} - 1} - \frac{27\sqrt{10 - 2\sqrt{5}}}{2\left(\sqrt{5} - 1\right)}$$

Series representations

$$27\left(\sqrt{4096 + 276} - 2 - \frac{\sqrt{10 - 2\sqrt{5}} - 2}{\left(\sqrt{5} - 1\right)2}\right) + \phi = \left(162 - 108\sqrt{1093} - 2\,\phi - 108\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} + 108\sqrt{1093}\,\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} + 2\,\phi\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} - 27\sqrt{9 - 2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9 - 2\sqrt{5}\right)^{-k}\right)\Big/\left(2\left(-1 + \sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k}\right)\right)$$

$$27\left(\sqrt{4096+276}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$

$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+\right.$$
$$108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+2\phi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$
$$\left.27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)\Bigg/$$
$$\left(2\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

$$27\left(\sqrt{4096+276}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$

$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+\right.$$
$$108\sqrt{1093}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+$$
$$2\phi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}-$$
$$\left.27\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)\Bigg/$$
$$\left(2\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

From which:

(27((4372)^1/2-2-1/2(((√(10-2√5) -2))⁄((√5-1))))+φ)^1/15

Input

$$\sqrt[15]{27\left(\sqrt{4372}-2-\frac{1}{2}\times\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)+\phi}$$

ϕ is the golden ratio

Exact result

$$\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}$$

Decimal approximation

1.6438185685849862799902301317036810054185756873505184804834183124 …

$1.64381856858\ldots. \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Alternate forms

$$\sqrt[15]{\phi-54+54\sqrt{1093}-\frac{27\left(\sqrt{10-2\sqrt{5}}-2\right)}{2\left(\sqrt{5}-1\right)}}$$

$$\frac{1}{\sqrt[15]{\dfrac{2\left(\sqrt{5}-1\right)}{166-108\sqrt{5}-108\sqrt{1093}+108\sqrt{5465}-27\sqrt{2\left(5-\sqrt{5}\right)}}}}$$

$$\sqrt[15]{\boxed{\begin{aligned}&\text{root of }\ 256x^8+95\,744x^7-3\,248\,750\,080x^6-914\,210\,725\,504x^5+\\&\quad 15\,498\,355\,554\,921\,184x^4+2\,911\,478\,392\,539\,914\,656x^3-\\&\quad 32\,941\,144\,911\,224\,677\,091\,680x^2-3\,092\,528\,914\,069\,760\,354\,714\,456x+\\&\quad 26\,320\,050\,609\,744\,039\,027\,169\,013\,041\ \ \text{near}\ \ x=1729.05\end{aligned}}}$$

Minimal polynomial

$$\begin{aligned}&256x^{120}+95\,744x^{105}-3\,248\,750\,080x^{90}-\\&\quad 914\,210\,725\,504x^{75}+15\,498\,355\,554\,921\,184x^{60}+\\&\quad 2\,911\,478\,392\,539\,914\,656x^{45}-32\,941\,144\,911\,224\,677\,091\,680x^{30}-\\&\quad 3\,092\,528\,914\,069\,760\,354\,714\,456x^{15}+26\,320\,050\,609\,744\,039\,027\,169\,013\,041\end{aligned}$$

Expanded forms

$$\sqrt[15]{\frac{1}{2}\left(1+\sqrt{5}\right)+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}$$

$$\sqrt[15]{-\frac{187}{4}+\frac{29\sqrt{5}}{4}+54\sqrt{1093}-\frac{27}{8}\sqrt{10-2\sqrt{5}}-\frac{27}{8}\sqrt{5\left(10-2\sqrt{5}\right)}}$$

All 15th roots of ϕ + 27 (-2 + 2 sqrt(1093) - (sqrt(10 - 2 sqrt(5)) - 2)/(2 (sqrt(5) - 1)))

$$e^0\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}\approx 1.64382\ \ \text{(real, principal root)}$$

$$e^{(2i\pi)/15}\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}\approx 1.50170+0.6686\,i$$

.

$$e^{(4i\pi)/15}\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}\approx 1.0999+1.2216\,i$$

.

$$e^{(2i\pi)/5}\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}\approx 0.5080+1.5634\,i$$

.

$$e^{(8i\pi)/15}\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}\approx -0.17183+1.63481\,i$$

.

Series representations

$$\sqrt[15]{27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi}=$$
$$\frac{1}{\sqrt[15]{2}}\left(\left(\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+2\phi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}-27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}\right)\Big/\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)\right)^\wedge(1/15)\right)$$

$$\sqrt[15]{27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi} =$$

$$\begin{aligned}
&\frac{1}{\sqrt[15]{2}}\Bigg(\Bigg(\Bigg(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+\\
&\qquad 108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+2\phi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-\\
&\qquad 27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}\Bigg)\Big/\\
&\quad\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\Bigg)\wedge(1/15)\Bigg)
\end{aligned}$$

$$\sqrt[15]{27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi} =$$

$$\begin{aligned}
&\frac{1}{\sqrt[15]{2}}\Bigg(\Bigg(\Bigg(162-108\sqrt{1093}-2\phi-108\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+\\
&\qquad 108\sqrt{1093}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+\\
&\qquad 2\phi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}-\\
&\qquad 27\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\Bigg)\Big/\\
&\quad\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\Bigg)\wedge(1/15)\Bigg)
\end{aligned}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

Integral representation

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0<\gamma<-\operatorname{Re}(a) \text{ and } |\arg(z)|<\pi)$$

From:

An Update on Brane Supersymmetry Breaking - *J. Mourad and A. Sagnotti -* arXiv:1711.11494v1 [hep-th] 30 Nov 2017

From the following vacuum equations:

$$T\, e^{\gamma_E\, \phi} \;=\; -\, \frac{\beta_E^{(p)}\, h^2}{\gamma_E}\; e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

$$16\, k'\, e^{\,-\,2\,C} \;=\; \frac{h^2 \left(p \,+\, 1 \,-\, \frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}}{(7 \,-\, p)}$$

$$(A')^2 \;=\; k\, e^{\,-\,2\,A} \;+\; \frac{h^2}{16(p\,+\,1)} \left(7 \,-\, p \,+\, \frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

we have obtained, from the results almost equals of the equations, putting

$4096\, e^{-\pi\sqrt{18}}$ instead of

$$e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

a new possible mathematical connection between the two exponentials. Thence, also the values concerning p, C, β_E and ϕ correspond to the exponents of e (i.e. of exp). Thence we obtain for p = 5 and $\beta_E = 1/2$:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

Therefore, with respect to the exponentials of the vacuum equations, the Ramanujan’s exponential has a coefficient of 4096 which is equal to 64^2, while $-6C+\phi$ is equal to $-\pi\sqrt{18}$. From this it follows that it is possible to establish mathematically, the dilaton value.

For

exp((-Pi*sqrt(18))   we obtain:

Input:

$$\exp\left(-\pi\sqrt{18}\right)$$

Exact result:

$$e^{-3\sqrt{2}\,\pi}$$

Decimal approximation:

$$1.6272016226072509292942156739117979541838581136954016\ldots \times 10^{-6}$$

$1.6272016\ldots * 10^{-6}$

Property:

$e^{-3\sqrt{2}\,\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{18}} = e^{-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\mathrm{Res}_{s=-\frac{1}{2}+j}\,17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now, we have the following calculations:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

$$e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10\text{^}{-6}$$

from which:

$$\frac{1}{4096}e^{-6C+\phi} = 1.6272016\ldots * 10\text{^}{-6}$$

$$0.000244140625\, e^{-6C+\phi} = e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10\text{^}{-6}$$

Now:

$$\ln\left(e^{-\pi\sqrt{18}}\right) = -13.328648814475 = -\pi\sqrt{18}$$

and:

(1.6272016* 10^-6) *1/ (0.000244140625)

Input interpretation:

$$\frac{1.6272016}{10^6} \times \frac{1}{0.000244140625}$$

Result:

0.0066650177536

0.006665017...

Thence:

$$0.000244140625\ e^{-6C+\phi} = e^{-\pi\sqrt{18}}$$

Dividing both sides by 0.000244140625, we obtain:

$$\frac{0.000244140625}{0.000244140625} e^{-6C+\phi} = \frac{1}{0.000244140625} e^{-\pi\sqrt{18}}$$

$$e^{-6C+\phi} = 0.0066650177536$$

((((exp((-Pi*sqrt(18)))))))*1/0.000244140625

Input interpretation:

$$\exp\left(-\pi\sqrt{18}\right) \times \frac{1}{0.000244140625}$$

Result:

0.00666501785...

0.00666501785…

Series representations:

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096\exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}17^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096\exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)$$

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096\exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now:

$$e^{-6C+\phi} = 0.0066650177536$$

$$\exp\left(-\pi\sqrt{18}\right)\times\frac{1}{0.000244140625} =$$

$$e^{-\pi\sqrt{18}}\times\frac{1}{0.000244140625}$$

$$= 0.00666501785\ldots$$

From:

ln(0.00666501784619)

Input interpretation:

$\log(0.00666501784619)$

Result:

$-5.010882647757\ldots$

-5.010882647757…

Alternative representations:

$$\log(0.006665017846190000) = \log_e(0.006665017846190000)$$

$$\log(0.006665017846190000) = \log(a)\log_a(0.006665017846190000)$$

$$\log(0.006665017846190000) = -\text{Li}_1(0.993334982153810000)$$

Series representations:

$$\log(0.006665017846190000) = -\sum_{k=1}^{\infty} \frac{(-1)^k (-0.993334982153810000)^k}{k}$$

$$\log(0.006665017846190000) = 2 i \pi \left\lfloor \frac{\arg(0.006665017846190000 - x)}{2 \pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log(0.006665017846190000) = \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2\pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$\log(0.006665017846190000) = \int_1^{0.006665017846190000} \frac{1}{t}\, dt$$

In conclusion:

$$-6C + \phi = -5.010882647757 \ldots$$

and for C = 1, we obtain:

$$\phi = -5.010882647757 + 6 = 0.989117352243 = \boldsymbol{\phi}$$

Note that the values of n_s (spectral index) 0.965, of the average of the Omega mesons Regge slope 0.987428571 and of the dilaton 0.989117352243, are also connected to the following two Rogers-Ramanujan continued fractions:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi - 1)\sqrt{5}} - \varphi + 1} = 1 - \cfrac{e^{-\pi}}{1 + \cfrac{e^{-2\pi}}{1 + \cfrac{e^{-3\pi}}{1 + \cfrac{e^{-4\pi}}{1 + \ldots}}}} \approx 0.9568666373$$

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\dots}}}}\approx 0.9991104684$$

(http://www.bitman.name/math/article/102/109/)

Also performing the 512th root of the inverse value of the Pion meson rest mass 139.57, we obtain:

((1/(139.57)))^1/512

Input interpretation:

$$\sqrt[512]{\frac{1}{139.57}}$$

Result:

0.990400732708644027550973755713301415460732796178555551684...

0.99040073.... result very near to the dilaton value 0.989117352243 = $\boldsymbol{\phi}$ and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\dots}}}}\approx 0.9991104684$$

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References

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